

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
MARSHALL DIVISION**

**NEXUS DISPLAY TECHNOLOGIES
LLC,**

Plaintiff

vs.

DELL INC., *et al.*,

Defendants.

§
§
§
§
§
§
§
§
§
§

CIVIL ACTION NO. 2:14-CV-762

MEMORANDUM AND ORDER

This Memorandum Opinion construes the disputed claim terms in United States Patent Numbers 5,835,498, 7,143,328, 7,295,578, and 7,599,439. Also before the Court is Defendant Dell, Inc.'s ("Dell") Motion to Strike Plaintiff Nexus Display Technologies, LLC's Untimely Expert Declaration in Support of Its Claim Construction Brief (Docket No. 128) and Dell and Defendant Lenovo (United States) Inc.'s Opposed Motion for Leave to File Supplemental Briefing (Docket No. 160). On June 24, 2015, the parties presented arguments on the disputed claim terms. At the claim construction hearing, the Court inquired whether the parties wanted to present oral argument on Dell's Motion to Strike, but the parties stated that they would rest on the papers. Docket No. 155 at 109:24–110:7, 110:9–11 and 110:14–15 ("*Markman* Hr'g Tr."). For the reasons discussed below, the Court **DENIES** the Motion to Strike (Docket No. 128) and **GRANTS** the Motion to Supplement (Docket No. 160). The Court resolves the claim term disputes as stated below.

BACKGROUND

Plaintiff Nexus Display Technologies, LLC's ("NDT") alleges that Defendants Defendant Dell, Inc.'s ("Dell") and Lenovo (United States) Inc. ("Lenovo") (collectively, "Defendants") infringe United States Patent Numbers 5,835,498 (" '498 Patent"), 7,143,328 (" '328 Patent"), 7,295,578 (" '578 Patent"), and 7,599,439 (" '439 Patent") (collectively, "Asserted Patents"). The Asserted Patents generally relate to the connection and interface between a computer system and a display device. Docket No. 123 at 1.

DELL'S MOTION TO STRIKE

On May 26, 2015, Dell filed a motion to strike NDT's expert declaration by Dr. William H. Mangione-Smith. Docket No. 128 at 1. Dell contends NDT failed to timely disclose the declaration as required by Patent Rule 4-3. *Id.* Dell argues that Rule 4-3 disclosures were due in this case by April 20, 2015, and Dr. Mangione-Smith's declaration was not disclosed until NDT's opening claim construction brief on May 11, 2015. *Id.* at 2, *see also*, Docket No. 47 and 101. Dell states that it was prejudiced by NDT's failure to disclose because Dell had "two weeks to review, consider, depose, and respond" to the declaration, instead of five weeks. *Id.* at 3, fn. 2. NDT responds that it complied with the Patent Rules. Docket No. 144 at 1. NDT argues that it satisfied the Rule 4-3 requirements by referencing its intention to rely on expert testimony and identifying Dr. Mangione-Smith by name with the subject matter he would opine on. Docket No. 144 at 3-4.

Here, NDT complied with Local Rule 4-3. In NDT's opening claim construction brief, testimony from Dr. Mangione-Smith was relied on for various terms. *See*, Docket No. 123 at 8, 14-16, and 24-26. In the parties' Joint Claim Construction and Prehearing Statement, NDT identified Dr. Mangione-Smith and a summary of his testimony for each of those terms. *See*,

Docket No. 106 at 3–4, 6–7, and 18–19. Accordingly, Dell’s motion to strike (Docket No. 128) is **DENIED**.

MOTION TO SUPPLEMENT

On July 23, 2015, Defendants filed an opposed motion for leave to file supplemental briefing (Docket No. 160) with respect to the term “a second rate that is at least substantially equal to (N/K)P per unit time” from the ’439 Patent. On July 27, 2015, the Court ordered the parties to file an agreed briefing schedule as to the underlying motion without granting the request to supplement. *See*, Docket No. 165. Instead of briefing whether Defendants’ request to supplement was proper, the parties briefed the merits regarding the proposed supplementation. *See*, Docket Nos. 161; 173; 175; and 176. Having considered all the briefing, the Court declines to incorporate Defendants’ supplementation into its construction because the metes and bounds of the ’439 Patent sufficiently provide context for the term’s meaning. *See, e.g., SunRace Roots Enter. Co., Ltd. v. SRAM Corp.*, 336 F.3d 1298, 1307 (Fed. Cir. 2003) (finding that consideration of inventor testimony was inappropriate because the intrinsic evidence resolved any ambiguity about the appropriate construction of the disputed term). However, Defendants’ Opposed Motion for Leave to File Supplemental Briefing (Docket No. 160) is **GRANTED**.

CLAIM CONSTRUCTION

APPLICABLE LAW

“It is a ‘bedrock principle’ of patent law that ‘the claims of a patent define the invention to which the patentee is entitled the right to exclude.’ ” *Phillips v. AWH Corp.*, 415 F.3d 1303, 1312 (Fed. Cir. 2005) (quoting *Innova/Pure Water, Inc. v. Safari Water Filtration Sys., Inc.*, 381 F.3d 1111, 1115 (Fed. Cir. 2004)). The Court examines a patent’s intrinsic evidence to define the patented invention’s scope. *Id.* at 1313–4; *Bell Atl. Network Servs., Inc. v. Covad Commc’ns*

Group, Inc., 262 F.3d 1258, 1267 (Fed. Cir. 2001). Intrinsic evidence includes the claims, the rest of the specification and the prosecution history. *Phillips*, 415 F.3d at 1312–3; *Bell Atl. Network Servs.*, 262 F.3d at 1267. The Court gives claim terms their ordinary and customary meaning as understood by one of ordinary skill in the art at the time of the invention. *Phillips*, 415 F.3d at 1312–3; *Alloc, Inc. v. Int’l Trade Comm’n*, 342 F.3d 1361, 1368 (Fed. Cir. 2003).

Claim language guides the Court’s construction of claim terms. *Phillips*, 415 F.3d at 1314. “[T]he context in which a term is used in the asserted claim can be highly instructive.” *Id.* Other claims, asserted and unasserted, can provide additional instruction because “terms are normally used consistently throughout the patent.” *Id.* Differences among claims, such as additional limitations in dependent claims, can provide further guidance. *Id.*

“[C]laims ‘must be read in view of the specification, of which they are a part.’ ” *Id.* (quoting *Markman v. Westview Instruments, Inc.*, 52 F.3d 967, 979 (Fed. Cir. 1995)). “[T]he specification ‘is always highly relevant to the claim construction analysis. Usually, it is dispositive; it is the single best guide to the meaning of a disputed term.’ ” *Id.* (quoting *Vitronics Corp. v. Conceptronic, Inc.*, 90 F.3d 1576, 1582 (Fed. Cir. 1996)); *Teleflex, Inc. v. Ficosa N. Am. Corp.*, 299 F.3d 1313, 1325 (Fed. Cir. 2002). In the specification, a patentee may define his own terms, give a claim term a different meaning that it would otherwise possess, or disclaim or disavow some claim scope. *Phillips*, 415 F.3d at 1316. Although the Court generally presumes terms possess their ordinary meaning, this presumption can be overcome by statements of clear disclaimer. *See, SciMed Life Sys., Inc. v. Advanced Cardiovascular Sys., Inc.*, 242 F.3d 1337, 1343–4 (Fed. Cir. 2001). This presumption does not arise when the patentee acts as his own lexicographer. *See, Irdeto Access, Inc. v. EchoStar Satellite Corp.*, 383 F.3d 1295, 1301 (Fed. Cir. 2004).

The specification may also resolve ambiguous claim terms “where the ordinary and accustomed meaning of the words used in the claims lack sufficient clarity to permit the scope of the claim to be ascertained from the words alone.” *Teleflex, Inc.*, 299 F.3d at 1325. For example, “[a] claim interpretation that excludes a preferred embodiment from the scope of the claim ‘is rarely, if ever, correct.’” *Globetrotter Software, Inc. v. Elam Computer Group Inc.*, 362 F.3d 1367, 1381 (Fed. Cir. 2004) (quoting *Vitronics Corp.*, 90 F.3d at 1583). But, “[a]lthough the specification may aid the court in interpreting the meaning of disputed language in the claims, particular embodiments and examples appearing in the specification will not generally be read into the claims.” *Constant v. Advanced Micro-Devices, Inc.*, 848 F.2d 1560, 1571 (Fed. Cir. 1988); *see also, Phillips*, 415 F.3d at 1323.

The prosecution history is another tool to supply the proper context for claim construction because a patentee may define a term during prosecution of the patent. *Home Diagnostics Inc. v. LifeScan, Inc.*, 381 F.3d 1352, 1356 (Fed. Cir. 2004) (“As in the case of the specification, a patent applicant may define a term in prosecuting a patent”). The well-established doctrine of prosecution disclaimer “preclud[es] patentees from recapturing through claim interpretation specific meanings disclaimed during prosecution.” *Omega Eng’g Inc. v. Raytek Corp.*, 334 F.3d 1314, 1323 (Fed. Cir. 2003). The prosecution history must show that the patentee clearly and unambiguously disclaimed or disavowed the proposed interpretation during prosecution to obtain claim allowance. *Middleton Inc. v. 3M Co.*, 311 F.3d 1384, 1388 (Fed. Cir. 2002); *see also, Springs Window*, 323 F.3d at 994 (“The disclaimer . . . must be effected with ‘reasonable clarity and deliberateness.’”) (citations omitted)). “Indeed, by distinguishing the claimed invention over the prior art, an applicant is indicating what the claims do not cover.” *Spectrum Int’l v. Sterilite Corp.*, 164 F.3d 1372, 1378–79 (Fed. Cir. 1988)

(quotation omitted). “As a basic principle of claim interpretation, prosecution disclaimer promotes the public notice function of the intrinsic evidence and protects the public’s reliance on definitive statements made during prosecution.” *Omega Eng’g, Inc.*, 334 F.3d at 1324.

Although “less significant than the intrinsic record in determining the legally operative meaning of claim language,” the Court may rely on extrinsic evidence to “shed useful light on the relevant art.” *Phillips*, 415 F.3d at 1317 (quotation omitted). Technical dictionaries and treatises may help the Court understand the underlying technology and the manner in which one skilled in the art might use claim terms, but such sources may also provide overly broad definitions or may not be indicative of how terms are used in the patent. *Id.* at 1318. Similarly, expert testimony may aid the Court in determining the particular meaning of a term in the pertinent field, but “conclusory, unsupported assertions by experts as to the definition of a claim term are not useful.” *Id.* Generally, extrinsic evidence is “less reliable than the patent and its prosecution history in determining how to read claim terms.” *Id.*

The patent in suit may contain means-plus-function limitations that require construction. Where a claim limitation is expressed in means-plus-function language and does not recite definite structure in support of its function, the limitation is subject to 35 U.S.C. § 112 ¶ 6. *Braun Med., Inc. v. Abbott Labs.*, 124 F.3d 1419, 1424 (Fed. Cir. 1997). In relevant part, § 112 mandates that “such a claim limitation be construed to cover the corresponding structure...described in the specification and equivalents thereof.” *Id.* (citing 35 U.S.C. § 112 ¶ 6.). Accordingly, when faced with means-plus-function limitations, courts “must turn to the written description of the patent to find the structure that corresponds to the means recited in the [limitations].” *Id.*

ANALYSIS

At issue are terms/phrases from claims 1, 5 and 12 from the '498 Patent; claims 1, 8, 28–29, 32 and 47 from the '578 Patent; and claims 1, 3, 8, 15, 17, 22, 29, 32 and 38–39 from the '439 Patent. On June 23, 2015, the parties filed a Notice stating the parties reached an agreement regarding the construction of three claims terms from the '328 Patent. Docket No. 148. On June 24, 2015, the Court circulated preliminary claim constructions intended to indicate where the undersigned stood after considering the claim construction briefing, and stated that he may change his position based upon the parties' arguments at the claim construction hearing. *Markman* Hr'g Tr. 3:9–13.

I. Agreed Terms

A. The '498 Patent

In the opening claim construction brief, NDT represents that the parties reached an agreement with respect to the term “having an inputs” in the '498 Patent. Docket No. 123 at 5. Dell and Lenovo do not address the agreement in their responsive claim construction brief. However, the parties stipulate to the agreement in their Joint Claim Construction and Prehearing Statement. Docket No. 106 at 1. Also at the claim construction hearing, the parties reached an agreement with respect to terms involving “encoder” and “decoder” in the '498 Patent based on the Court's preliminary claim constructions. *Markman* Hr'g Tr. 3:14–4:5. The constructions agreed to by the parties are as follows:

| Claim Terms | Agreed Claim Construction |
|--------------------------------------|---|
| having an inputs | having an input |
| encoder | a device that encodes or translates bits of data into a corresponding encoded data word |
| encoder producing encoded data words | plain and ordinary meaning |
| decoder | a device that decodes or translates an encoded data word into respective bits of data |
| decoder...for decoding data words | plain and ordinary meaning |

In view of the parties' agreement on the proper construction of the above identified terms, the Court **ADOPTS** these constructions.

B. The '328 Patent

The parties agreed to the construction for three claims terms in the '328 Patent. Docket No. 148 at 1. This agreement resolves all pending claim construction disputes with respect to the '328 Patent. *Id.* The constructions agreed to by the parties are as follows:

| Claim Terms | Agreed Claim Construction |
|---|--|
| the auxiliary data [enable] signal is one of the appended to an end of the video data [enable] signal and pre-pended to a beginning of the video data [enable] signal | the auxiliary data [enable] signal is either merged with the trailing edge of the video [data] enable signal at the start of the blanking period or merged with the leading edge of the video [data] enable signal at the end of the blanking period |
| pre-pended to a beginning of the video data [enable] signal | merged with the video data [enable] signal at the leading edge of the video data [enable] signal and at the end of the blanking period |
| appended to an end of the video data [enable] signal | merged with the video data [enable] signal at the trailing edge of the video data [enable] signal and the start of the blanking period |

In view of the parties' agreement on the proper construction of the above identified terms, the Court **ADOPTS** these constructions.

C. The '578 Patent

In the opening claim construction brief, NDT represents that the parties reached an agreement with respect to the term “at least one audio data stream” in the '578 Patent. Docket No. 123 at 5. Dell and Lenovo do not address the agreement. The construction agreed to by the parties is as follows:

| Claim Terms | Agreed Claim Construction |
|--------------------------------|-----------------------------------|
| at least one audio data stream | at least one stream of audio data |

In view of the parties' agreement on the proper construction of the above identified terms, the Court **ADOPTS** these constructions.

II. Disputed Terms

A. The '498 Patent

1. “isochronous control codes”

| NDT's Proposed Construction | Defendants' Proposed Construction |
|--|---|
| control codes that indicate the transfer of time critical data such as timing control signals of video or other data | control codes indicating the transfer of time critical data and inserted into the data stream immediately so that their correct relative timing will be preserved |

The parties agree that “isochronous control codes” are “control codes that indicate the transfer of time critical data.” However, the parties dispute whether “isochronous control codes” must be “inserted into the data stream immediately.” NDT contends that its proposed construction comes straight from the '498 Patent specification. Docket No. 123 at 22 (citing '498 Patent at 6:53–58) (“The second type of control word is the isochronous data transfer word. These control words indicate the transfer of time critical data such as timing control signals of video or other data. The isochronous special word can be sent at any time without interfering with the other streams”). NDT argues that Defendants' construction adds an improper limitation

in conflict “with the specification, which states that an isochronous control code ‘can be sent at any time.’ ” *Id.* at 23 (citing ’498 Patent at 6:56–58). Defendants state NDT’s proposed construction fails to address when the codes are sent and ignores representations made in the specification that they must be sent immediately to preserve the timing between them. Docket No. 130 at 22.

Though the Court agrees with Defendants that “isochronous control codes” need to be treated with some sort of priority, the Court finds that “immediately” adds an unwarranted temporal limitation into the apparatus claims in the ’498 Patent. The specification describes rules for signal output and states that “[t]he isochronous data transfer words are input into the data stream output by the multiplexor 48 when receive[d] and *have the highest priority*.” ’498 Patent at 7:62–64 (emphasis added). As an example of this, the specification describes that, when needed, the isochronous or time critical data can be inserted in the middle of data transmission. *Id.* at 10:12–15. Figure 6 also provides an example that “ensures that if there are any isochronous signals to be sent over the link 28 they will be injected into the data stream immediately to preserve their timing.” *Id.* at 11:6–9. Construing “isochronous control codes” as having the highest priority would indicate that these control codes “can be sent at any time without interfering with the other streams.” ’498 Patent at 6:56–57; *see also*, Docket No. 131-10 at 31 (’498 File History, 10/6/97 Amendment) (“The isochronous special word is sent at any time without interfering with the other streams.”).

At the claim construction hearing, NDT stated it is concerned that “highest priority” improperly adds a dependent claim limitation to an independent claim. *Markman* Hr’g Tr. at 58:1–18. While the Court is mindful of importing limitations not contemplated by the claims,

the '498 Patent's use of "isochronous control codes" throughout the specification indicates that each embodiment contemplated by the claims would treat the codes with the "highest priority."

Finally during prosecution, the patentees distinguished the claims by arguing that "isochronous control codes" are capable of maintaining the relative timing between related control codes. Specifically, the patentees argued that "the present invention maintains the relative timing between the start of sync isochronous control code and the end of sync isochronous control code for their inclusion into the serial bit stream..." Docket No. 131-10 at 31 ('498 File History, 10/6/97 Amendment). The patentees further argued that the "use of isochronous control codes and the speed of the serial link allows multiple streams of video data to be transmitted over the same serial link while preserving the timing information for each video stream." *Id.* The patentees stated that this was "not possible with any of the cited prior art references," and "[a]ll that is required here is that the relative timing between related isochronous control codes of the same data stream be maintained." *Id.* at 31–32. Therefore, the Court construes **"isochronous control codes"** to mean **"control codes that have the highest priority and indicate the transfer of time critical data (such as timing control signals of video or other data), and are capable of maintaining the relative timing between related control codes."**

2. "other control codes identifying streams"

| NDT's Proposed Construction | Defendants' Proposed Construction |
|---|---|
| control codes that identify the start, end or type of a data stream | control words unique to each data stream that indicate the start or end of that data stream |

The parties agree that "other control codes identifying streams" are control codes—or words—that indicate "the start or end of a data stream." However, the parties dispute whether the codes must be "unique to each data stream." NDT contends that adding "unique to each data

stream,” as Defendants propose, improperly reads a limitation from the specification into the claims. Docket No. 123 at 24. Defendants respond that the claims require more than identifying “the start or end of a data stream.” Docket No. 130 at 26. Defendants argue that NDT’s construction fails to uniquely identify any stream as distinct from the other streams as required by the claim’s plain meaning. *Id.* at 26–27.

Although the claim language does require identifying the data stream, “identification” is not necessarily synonymous with “uniqueness.” Identifying a stream would distinguish it from other streams that start or end at different times or carry different types of data, but it would not necessarily require a control word “unique to each data stream.” Figure 4B illustrates a video data stream and a multimedia data stream, and the specification states that “[multimedia data] stream 1 has a different data start word than that used for video start word.” ’498 Patent at 10:6–8. Thus, the “multimedia data stream has its own special start control word for identification.” *Id.* at 10:5–6. However, this is not a requirement that control words be “unique to each data stream.” It simply provides one way for the data stream to be identified, which can be accomplished by separating multiple data streams and indicating the start and end of a certain type of data transfer, as stated in the specification.

Additionally, the specification states that “[t]he present invention provides a unique control and separation scheme in which four categories of special or control words are used.” ’498 Patent at 6:44–46. The specification identifies the third of the four control words as a data stream separation word. *Id.* at 6:58–59. The specification states that this control word “separates between multiple contexts of data streams and indicates the start or end of a certain type of data transfer.” *Id.* at 6:59–61. Accordingly, the Court construes “**other control codes identifying**

streams” to mean “control codes that identify and separate multiple data streams and indicate the start or end of a certain type of data transfer.”

B. The ’578 Patent

1. “clock channel of the link”

| NDT’s Proposed Construction | Defendants’ Proposed Construction |
|---|--|
| a channel of the link that transmits a signal representative of a clock | only channel of the link for transmitting a clock signal |

The parties dispute whether the phrase “clock channel of the link” is limited only to one channel transmitting a clock signal, or if it is a channel transmitting a signal representative of a clock. NDT states that the ’578 Patent “contemplates a variety of [embodiments for] transmitting a signal to the receiver that is representative of a clock.” Docket No. 123 at 13. NDT argues that its proposed construction incorporates those embodiments as disclosed in the specification where a clock data may be transmitted on multiple channels. *Id.* at 13–14. NDT contends that Defendants’ proposed construction improperly narrows the term to a single embodiment. *Id.*

Defendants maintain that their proposed construction captures what the ’578 Patent teaches: “a single channel for sending all clock signals.” Docket No. 130 at 32. Defendants argue that the ’578 Patent teaches that clocks signals should “be sent on one ‘continuous’ clock channel” and there are not any embodiments where more than one channel is used to transmit clock signals. *Id.* at 33. Defendants further argue that NDT’s proposed construction is contrary to the ’578 Patent’s disclosure for transmitting a clock signal over a single channel. *Id.* at 34.

Defendants are correct that the specification emphasizes that the clock channel must be capable of continuously transmitting timing information and other data. Specifically, the specification states that “[i]t is advantageous to send the auxiliary clock of the present invention

on a continuous channel while transmitting auxiliary data (which can be easily buffered) on an intermittent channel (i.e., only during blanking intervals when a video data enable signal DE is low), to exploit the advantages of the properties of both the continuous and intermittent channels.” ’578 Patent at 10:10–16. Likewise, the specification states that “[t]he video blanking intervals of a TMDS-like link (e.g., that of FIG. 6) provide a large bandwidth for sending audio data (but are not continuous), while the video clock channel of a TMDS-like link (e.g., Channel C of FIG. 6) is continuous and therefore better for sending timing information (such as a sampling clock for one or more streams of audio data or other auxiliary data, as well as a video clock).” *Id.* at 10:26–33; *see also, id.* at 9:59–67, 11:21–78.

However, contrary to Defendants’ contention, the intrinsic evidence indicates that the claims are not limited to a single embodiment where clock signals are sent over a single channel. The ’578 Patent states that “[t]hroughout the specification and in the claims the expression ‘TMDS-like link’ will be used to denote a serial link, capable of transmitting digital video data (and a clock for the digital video data) from a transmitter to a receiver, and optionally also transmitting one or more additional signals (bidirectionally or unidirectionally) between the transmitter and receiver, that is or includes either a TMDS link or a link having some but not all of the characteristics of a TMDS link.” *Id.* at 5:7–15. The specification also states that “although a TMDS link has four differential pairs (in the single pixel version), three for video data and the other for a video clock, a TMDS-like link could have a different number of conductors or conductor pairs.” *Id.* at 5:52–56. The specification further states that “[i]t is within the scope of the invention to employ combinations of channels for transmitting auxiliary data (and/or auxiliary data clocks or timing information) in either or both directions over a TMDS-like link.” *Id.* at 47:44–47. Thus, the specification indicates that the claims are not

limited to the TMDS link or the number of conductors illustrated in Figure 6 or, in other words, a single channel for a clock signal.

Finally, neither NDT nor Defendants propose language that accurately captures what the channel actually transmits (*i.e.*, timing information and other data). The specification states that “the invention is a communication system including a transmitter, a receiver, and a TMDS-like link, in which video data and auxiliary data (often including timing data associated with other auxiliary data) are transmitted from the transmitter to the receiver, or in which video data are transmitted over the link from the transmitter to the receiver, and auxiliary data (*often including timing data associated with other auxiliary data*) are transmitted from the receiver to the transmitter (or from the transmitter to the receiver and also from the receiver to the transmitter).” ’578 Patent at 6:36–46 (emphasis added). The specification further states that “timing information for audio data (e.g., a clock for recovering transmitted audio data) falls within the scope of ‘auxiliary data.’ ” *Id.* at 6:4–6. Likewise, the specification states that “the video clock channel of a TMDS-like link (e.g., Channel C of FIG. 6) is continuous and therefore better for sending timing information (such as sampling clock for one or more streams of audio data or other auxiliary data, as well as a video clock).” *Id.* at 10:29–33. Accordingly, the Court construes **“clock channel of the link”** to mean **“at least one channel of the link capable of continuously transmitting timing information and other data.”**

2. “closely matching the auxiliary data rate”

| NDT’s Proposed Construction | Defendants’ Proposed Construction |
|-----------------------------|-----------------------------------|
| No construction necessary. | Indefinite. |

The parties dispute whether the term “closely matching” is indefinite. Defendants claim the term “closely matching” is indefinite because the ’578 Patent does not provide an objective

standard for a person of ordinary skill in the art to determine “how ‘close’ the clock frequency and the auxiliary data rate must be in order to be ‘closely matching.’ ” Docket No. 130 at 35.

Patent claims must particularly point out and distinctly claim the subject matter regarded as the invention. 35 U.S.C. § 112(b). The Supreme Court recently described this statutory provision as requiring a “delicate balance” between the “inherent limitations of language” and the need of patents to “afford clear notice of what is claimed, thereby apprising the public of what is still open to them” so as to avoid “a zone of uncertainty which enterprise and experimentation may enter only at the risk of infringement claims.” *Nautilus, Inc. v. Biosig Instruments, Inc.*, 134 S. Ct. 2120, 2128–29 (2014). “[A]bsent a meaningful definiteness check...patent applicants face powerful incentives to inject ambiguity into their claims.” *Id.* at 2129.

In order to meet the “exacting standard” to prove indefiniteness, an accused infringer must demonstrate by clear and convincing evidence that the claims, read in light of the specification and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention. *Id.* at 2124. Prior to *Nautilus*, a claim was indefinite only if a challenger could prove, by clear and convincing evidence, that it was “not amenable to construction” or was “insolubly ambiguous.” *Halliburton Energy Servs., Inc. v. M-I, LLC*, 514 F.3d 1244, 1249–50 (Fed. Cir. 2008) (citing *Datamize, LLC v. Plumtree Software, Inc.*, 417 F.3d 1342, 1347 (Fed. Cir. 2005)). According to the Supreme Court, the new “reasonable certainty” standard “mandates clarity while recognizing that absolute precision is unattainable.” *Nautilus*, 134 S. Ct. at 2124. The Court found that the previously-applicable “amenable to construction” and “insolubly ambiguous” standards “breed lower court confusion” and “diminish the definiteness requirement’s public-notice function and foster the innovative-discouraging ‘zone of

uncertainty.’ ” *Id.* at 2130.

NDT maintains that terms of degree are not inherently indefinite, and that absolute precision is not required in determining “closely matching.” *Markman* Hr’g Tr. at 89:1–90:1. NDT argued that “closely matching” is analogous to this District and the Federal Circuit’s previous constructions on terms of degree. *Id.* at 89:3–6 (citing *Innovative Display Technologies, LLC v. Nissan Motor Co., Ltd., et al.*, No. 2:14-cv-202-JRG, Docket No. 244 at 31 (E.D. Tex. May 4, 2015) (construing “in close proximity” to have its plain meaning); and *Biosig Instruments, Inc. v. Nautilus, Inc.*, 783 F.3d 1374, 1384 (Fed. Cir. 2015) (finding “the ‘spaced relationship’ phrase ‘inform[s] those skilled in the art about the scope of the invention with reasonable certainty.’ ”)). NDT contends “closely matching” is not indefinite “because the specification provides context that explains the purpose of the term, which sets the boundaries of the term for a person of ordinary skill in the art.” Docket No. 123 at 14.

The only intrinsic evidence NDT cites is the specification’s statement that “[e]ven if such frequency variations have magnitude of on the order of only a few parts per million, they can cause phase errors to accumulate to a degree that will eventually cause the receiver to experience overflow or underflow errors.” *Id.* at 16 (quoting ’578 Patent at 16:39–43); and *Markman* Hr’g Tr. 90:16–91:13 (citing ’578 Patent at 16:38–41). NDT contends that by explaining this purpose for which the rates must be “closely matching,” the ’578 Patent conveys the meaning of this term with reasonable certainty to a person of ordinary skill in the art. Docket No. 123 at 20. The Court disagrees. Although this indicates that problems will occur if the rates differ by only “a few parts per million,” it provides no indication of how much smaller any difference must be for the rates to be “closely matching.” Indeed, NDT argues that the ’578 Patent explains that experimentation or testing should be conducted “to detect such an error before it occurs and

introduce corrections.” ’578 Patent at 16:41–43. However, relying exclusively on experimentation cannot meet the new “reasonably certainty” standard.

Moreover, while the Court agrees with NDT that terms of degree are not inherently indefinite, the converse is also true—terms of degree are not inherently definite. In this case, the ’578 Patent claim language contains little express guidance about the meaning of “closely matching.” Claims 28, 29, and 32 recite an “auxiliary clock generation circuitry” configured to “generate an auxiliary clock having frequency closely matching the auxiliary data rate.” ’578 Patent at 59:22–65 and 60:8–28. This and the surrounding claim language do not provide any indication how “close” the data rate must be matched. Turning to the specification, it describes regenerating an auxiliary clock at the receiver as follows:

Data transmission over TMDS-like links typically occurs with delays that vary over time, and this makes it difficult to reproduce the necessary timing relationships at the receiver. This is especially true in cases where data are stored for a time (in a memory structure for example) and then transmitted in blocks or “packets” over the link. While the exact timing of data might be distorted at the receiver, periodic signals (e.g., streams of audio or video data words transmitted at the rate of one word, or a fixed number of words, per clock pulse) transmitted over a TMDS-like are recovered at an “average” data rate in the receiver that matches the average data rate at which they were transmitted by the original source (the transmitter). A variety of techniques that use this idea to regenerate (at a receiver) a stream of transmitted auxiliary data at a data rate that *closely matches* the data rate at which the auxiliary data was transmitted at the transmitter.

’578 Patent at 15:31–48 (emphasis added). The specification indicates that there are a variety of techniques that may be used to generate a data rate that “closely matches” the data rate at which the auxiliary data was transmitted at the transmitter. However, the specification fails to provide objective boundaries for determining whether a data rate “closely matche[s]” another data rate. *Interval Licensing, LLC v. AOL, Inc.*, 766 F.3d 1364, 1370–1371 (Fed. Cir. 2014) (“The claims,

when read in light of the specification and the prosecution history, must provide objective boundaries for those skilled in the art.”). As such, a person of ordinary skill in the art would not know whether data rate differences of 1-bit per second (bps) or 1-megabit per second (Mbps) are “closely matching.” Finally, the prosecution history provides no assistance for this term, and neither party, nor their experts, cite to any portion of the prosecution record to support their positions. Accordingly, the Court finds that **“closely matching the auxiliary data rate”** is **indefinite** because the term, viewed in light of the specification, fails to “inform those skilled in the art about the scope of the invention with reasonable certainty.” *Nautilus*, 134 S. Ct. at 2129.

C. The '439 Patent

1. “P”

| NDT’s Proposed Construction | Defendants’ Proposed Construction |
|-----------------------------|--|
| No construction necessary. | the frequency of the video pixel clock |

The dispute centers on whether the term “P” requires construction, and whether it should be construed as a “pixel clock.” NDT maintains that no construction is necessary because the claim language defines “P” as equal to the rate “per unit time” at which the “N-bit words of video data are asserted to the subsystem.” Docket No. 123 at 7. NDT argues that Defendants’ expert, Dr. Dan Schonfeld, recognized that this claim language defines “P.” Docket No. 135 at 3 (quoting Docket No. 131-15 at ¶ 191, Ex. 14 (“Schonfeld Decl.”)) (“Claims 1 and 39 each recite ‘the N-bit words of video data are asserted to the subsystem at a first rate equal to P of the N-bit words per unite time.’ ”). NDT contends that Defendants’ proposed construction would limit “P” to a specific embodiment from the specification. Docket No. 123 at 7. NDT argues that the claim language does not refer to a video pixel clock, and Defendants’ proposed construction makes the patentees’ use of “pixel clock” superfluous. *Id.* at 7–8.

Defendants contend that a person having ordinary skill in the art “would understand from the specification that a pixel clock regulates how quickly video words are generated, and that ‘P’ is the frequency of the pixel clock.” Docket No. 130 at 9 (citing Docket No. 131-15 at ¶¶ 191–93 (“Schonfeld Decl.”)). Defendants argue that the ’439 Patent specification always refers to “P” as the frequency of the pixel clock. *Markman* Hr’g Tr. at 34:25–35:6. Defendants argue the prosecution history also lends support for such a construction because that the patentees were required to choose a specific embodiment and elected the embodiment where “P” is the “pixel clock” frequency. Docket No. 130 at 9. Defendants state that the patentees’ election of Figure 8 in response to a restriction requirement requires reading a “pixel clock” into the term “P.” *Id.* at 9–10, *Markman* Hr’g Tr. at 29:16–30:18.

The Court disagrees with Defendants’ contention that the patentees’ election of Figure 8 supports a construction with “P” having a “pixel clock.” It is unclear from the correspondence between the Patent and Trademark Office (“PTO”) and the patentees whether “P” was interpreted by any party as being a “pixel clock.” The PTO required an election of embodiments related to either Figure 7 or Figure 8, and did not provide any reason why these figures represented different species. *See*, Docket No. 131-6 at 4. Moreover, the specification states that “[w]ith regard to the color packing state machine and the link control messages described above, the fundamental principles of operation are the same for FIG. 7 and FIG. 8; the differences are only at the implementation level.” ’439 Patent at 35:31–34. “Given these ambiguities, there is no basis to limit the broadly drafted claims at issue.” *Plantronics, Inc. v. Aliph, Inc.*, 724 F.3d 1343, 1352 (Fed. Cir. 2013).

The specification states that “[t]hroughout this disclosure (including in the claims) the expression ‘pixel clock’ (or ‘source pixel clock’) denotes the pixel rate clock employed by a

transmitter to receive (from a source) or generate video data to be transmitted over a serial link (e.g., video data to be encoded, serialized, and then transmitted over a serial link).” ’439 Patent at 1:17–23. However, a “pixel clock” is not recited in claims 1 and 39. Instead, the claims only recite “a first rate equal to P.” *Id.* at 46:11 and 55:5–6. *See generally, Interactive Gift Express, Inc. v. CompuServe, Inc.*, 256 F.3d 1323, 1331 (Fed. Cir. 2001) (“In construing claims, the analytical focus must begin and remain centered on the language of the claims themselves, for it is that language that the patentee chose to use....”). This is consistent with the specification’s repeated disclosure of receiving or generating “[n]-bit video data at rate P,” without reciting a “pixel clock.” ’439 Patent at 7:65–8:24. Similarly, the Summary of the Invention section states that “the N-bit words of video data are received or generated by the transmitter at rate P.” *Id.* at 5:1–2.

Defendants are correct that the specification also states that N-bit words of video data are “typically clocked into the transmitter using a pixel clock having frequency P.” ’498 Patent at 6:7–8. However, stating that a “pixel clock” has a frequency “P” is not the same as requiring “P” to always be the frequency of a “pixel clock.” As NDT contends, Defendants’ construction reads in a “pixel clock” element into the claims through “P.” Moreover, when the patentees intended the claims to recite “clocks,” they explicitly recited the term in the claims. *See, e.g.*, ’439 Patent at 49:7–12. Accordingly, the Court construes “**P**” to mean “**the rate that the video data is received or generated by the transmitter.**”

2. “(N/K)P”

| NDT’s Proposed Construction | Defendants’ Proposed Construction |
|---|---|
| the value of P multiplied by the value of N divided by the value of K | a clock frequency that varies according to the formula P multiplied by N divided by K |

In addition to the dispute surrounding the construction of the term “P,” the parties disagree whether “ $(N/K)P$ ” includes a “clock frequency.” NDT contends that “ $(N/K)P$ ” is a formula “that multiplies the value of P by the value of N and then divides by the value of K,” with the resulting value being “a rate ‘per unit time.’ ” Docket No. 123 at 5–6. NDT argues that “N” is “the number of bits in a word of video data,” and where claim 1 describes “packing those N-bit words into a sequence of fragments, where ‘each fragment consists of K bits of the video data.’ ” *Id.* (quoting ’439 Patent at 45:61–63). NDT states that Defendants’ construction adds an improper claim limitation with the phrase “clock frequency.” *Id.* at 6. NDT argues that such a construction would “require the generation of a specific clock having a frequency equal to $(N/K)P$.” *Id.* NDT states that such a limitation is not in claim 1, and when the patentees intended the resulting value to have a specific clock frequency, they explicated did so. *Id.*

Defendants contend that NDT’s proposal does not provide any explanation, and only instructs how to do arithmetic. Docket No. 130 at 14. Defendants maintain that the equation needs context. *Id.* Defendants state that the specification provides such context by consistently referring to “ $(N/K)P$ ” as the link clock frequency, and the frequency depends on “P” (the pixel clock frequency) multiplied the ratio of “N/K.” *Id.* at 13. Defendants argue that the prosecution history supports their construction because the embodiment of Figure 8 “expressly described using a link clock that is a version of a clock generated ‘in response to [a] pixel clock’ and having ‘frequency $(N/8)P$ ’ (where $K=8$).” *Id.* at 14, *see also*, *Markman* Hr’g Tr. at 42:2–15 and 43:13–44:19.

The Court is not persuaded by Defendants’ argument as their proposal would import a limitation not reflected in the claims. For the reasons stated above, the intrinsic evidence indicates that “P” is “the rate that the video data is received or generated by the transmitter.”

With respect to the other variables, the intrinsic evidence indicates that “N” is a pixel word size or number of bits in a word of video data, and “K” is the link fragment size or link capacity. Specifically, the specification states that “N is the pixel words size (10 bits in this example) and K the link fragment size (8 bits in this example).” ’439 Patent at 44:59–61. Accordingly, the Court construes “**(N/K)P**” to mean **“the rate of the value of N divided by the value of K multiplied by the value of P, where: P is the rate that the video data is received or generated by the transmitter; N is pixel word size or number of bits in a word of video data; and K is link fragment size or link capacity.”**

3. “a second rate that is at least substantially equal to (N/K)P per unit time”

| NDT’s Proposed Construction | Defendants’ Proposed Construction |
|--|--|
| a second rate that is at least substantially equal to the value of P multiplied by the value of N divided by the value of K, per unit time | Indefinite. |

The parties dispute whether the intrinsic evidence provides an objective standard or boundary for measuring what qualifies as “substantially equal.” Defendants contend there is no boundary, making the term indefinite. Docket No. 130 at 17.

A party challenging the definiteness of a claim must show it is invalid by clear and convincing evidence. *Takeda Pharm. Co. v. Zydus Pharms. USA, Inc.*, 743 F.3d 1359, 1368 (Fed. Cir. 2014). The ultimate issue is whether someone working in the relevant technical field could understand the bounds of a claim. *Haemonetics Corp. v. Baxter Healthcare Corp.*, 607 F.3d 776, 783 (Fed. Cir. 2010). Specifically, “[a] patent is invalid for indefiniteness if its claims, read in light of the specification delineating the patent, and the prosecution history, fail to inform, with reasonable certainty, those skilled in the art about the scope of the invention.” *Nautilus*, 134 S. Ct. at 2124. “Although absolute or mathematical precision is not required, it is

not enough, as some of the language in our prior cases may have suggested, to identify ‘some standard for measuring the scope of the phrase.’ ” *Interval Licensing*, 766 F.3d at 1370–1371 (quoting *Datamize*, 417 F.3d at 1351). “The Supreme Court explained that a patent does not satisfy the definiteness requirement of § 112 merely because ‘a court can ascribe some meaning to a patent’s claims.’ ” *Id.* at 1371 (quoting *Nautilus*, 134 S. Ct. at 2130). “The claims, when read in light of the specification and the prosecution history, must provide objective boundaries for those of skill in the art.” *Id.* (citing *Nautilus*, 134 S. Ct. at 2130 & n.8).

NDT contends that term “substantially equal” is not indefinite and is proper under Federal Circuit law, which allows “accommodate[ions for] the minor variations that may be appropriate to secure the invention.” Docket No. 123 at 9–10 (quoting *Verve, LLC v. Crane Cams, Inc.*, 311 F.3d 1116, 1120 (Fed. Cir. 2002)). NDT argues the specification and the field of the invention would provide a person with ordinary skill in the art with the framework needed to understand that a “second rate” must be “substantially equal” to “(N/K)P” to prevent overrun and underrun issues during a data transmission. *Id.* at 9.

Defendants maintain that the term is indefinite because a person of ordinary skill in the art cannot determine with “reasonable certainty” whether the “second rate” is “at least substantially equal to” the value (N/K)P. Docket No. 130 at 17. Defendants argue that the specification does not provide “objective boundaries” for determining how equal the rates need to be in order to meet the “substantially equal” limitation. *Id.* at 17–18 (quoting *Interval Licensing*, 766 F.3d at 1370–71). Defendants contend that NDT’s standard—preventing overrun and underrun data transmission issues—is flawed because it is a vague standard that introduces new concepts not rooted in the specification. *Id.* at 18–19.

Here, the parties' focus on "substantially equal" ignores the relevant claim language of "*at least* substantially equal to." When considered in context, the claim language establishes that "at least substantially equal to" must have a minimum value where the "second rate" has to be at least equal to or greater than the rate resulting from "(N/K)P." A person of ordinary skill in the art would understand this because the specification repeatedly provides examples where the "second rate" must be "faster than," have a "higher rate," or "exceed" the resulting rate from "(N/K)P." *See*, '439 Patent at 9:2–5; 15:65–66; 19:31–32; 22:59–62; 26:15–19; and 27:21–42. As indicated in the specification, "faster than," "higher rate," and "exceeds" all inform a person of ordinary skill in the art that "at least substantially equal to" means "equal to or greater than."

The specification does disclose one embodiment where the transmitter operates in an 18-bit pixel mode (i.e., $N = 6$). '439 Patent at 8:5–9. In this embodiment, the video data over the link would be 75% of the video data rate ("P"), and not "faster than" the video data rate ("P"). *Id.* However, this is not a preferred embodiment, and a claim need not cover every disclosed embodiment in the specification. *See, August Tech. Corp. v. Camtek, Ltd.*, 655 F.3d 1278, 1285 (Fed. Cir. 2011) ("The mere fact that there is an alternative embodiment disclosed in the [asserted patent] that is not encompassed by [our] claim construction does not outweigh the language of the claim, especially when the court's construction is supported by the intrinsic evidence. This is especially true where, as here, other unasserted claims in the parent patent cover the excluded embodiments.") (internal quotation marks omitted)); *see also, Baran v. Medical Device Technologies, Inc.*, 616 F.3d 1309, 1316 (Fed. Cir. 2010) ("It is not necessary that each claim read on every embodiment.").

Defendants argue that this reads "substantially" out of the claims by eliminating a lower range, and improperly creating an infinite upper range. *Markman* Hr'g Tr. at 6:7–7:11. The

Court disagrees. Defendants’ request requires that the Court ignore “at least” in the context of the intrinsic evidence, and instead interpret “substantially equal” in a vacuum as a word of degree. *Energizer Holdings v. ITC*, 435 F.3d 1366, 1370 (Fed. Cir. 2006) (“Claim definiteness is analyzed ‘not in a vacuum, but always in light of the teachings of the prior art and of the particular application disclosure as it would be interpreted by one possessing the ordinary level of skill in the pertinent art.’ ”) (quoting *In re Moore*, 439 F.2d 1232, 1235 (CCPA 1971)). For the reasons stated above, “[t]he claims, when read in light of the specification and the prosecution history,...provide objective boundaries for those of skill in the art.” Specifically, the claim language establishes a minimum value that the “second rate” must be “*at least* substantially equal to” or greater—removing the notion that an upper range is needed. Accordingly, the Court construes “**a second rate that is at least substantially equal to (N/K)P per unit time**” to mean “**a second rate equal to or greater than the value of (N/K)P per unit time.**”

4. “each of the groups determines a different one of the N-bit words”

| NDT’s Proposed Construction | Defendants’ Proposed Construction |
|---|--|
| each of the groups determines different N-bit words | each group represents <u>only one</u> N-bit word |

The parties dispute whether the claims are limited to only one embodiment—where $N = 16$ —as illustrated in Table 1. ’439 Patent at 13:33–39. NDT argues under Federal Circuit law the word “a” means “one or more.” Docket No. 123 at 11 (citing *Accent Packaging, Inc. v. Leggett & Platt, Inc.*, 707 F.3d 1318, 1326 (Fed. Cir. 2013); *Baldwin Graphic Sys., Inc. v. Siebert, Inc.*, 512 F.3d 1338, 1342 (Fed. Cir. 2008)). NDT contend Defendants’ proposed construction limits the term to one specific embodiment and excludes preferred embodiments where each group can determine more than one word. *Id.* at 12. Defendants respond that there

are other claims covering the preferred embodiments, and their construction is rooted in claim language and the specification. Docket No. 130 at 15–16. Defendants contend that the claims do not “refer to ‘a’ N-bit data word, but rather say[] that each group ‘determines *a different one of the* N-bit words[,]’ ” where “one” is the operative word. *Id.* at 16 (emphasis in original). Defendants argue that each “group” could not determine “a different *one* of the N-bit words” if a “group” represented more than one N-bit word as NDT proposed. *Id.*

The Court is not persuaded by Defendants’ argument that the patentees intended to exclude embodiments from claims 1 and 39 because they are captured by claims 17 and 22. Unlike claims 17 and 22, claims 1 and 39 do not explicitly recite a “10-bit mode in which $N = 10$ ” or a “12 bit mode in which $N = 12$.” Moreover, claims 1 and 39 do not recite the number of fragments included in each group. This indicates that the patentees intended claims 1 and 39 to be broader than the specific embodiments recited in claims 17 and 22.

Furthermore, Defendants’ emphasis on “one” being the operative word is misplaced because it reads out the context given when construing “different one” as a whole. In its entirety the phrase inflicts a meaning of uniqueness rather than quantity, and the specification supports such a meaning. Here, Tables 1 through 5 illustrate that the patentees intended to follow the well-established patent ideology where “a” imposes a quantity, meaning “one or more.” Specifically, Table 1 illustrates that “each of the groups” can include 1, 2, or 4 N-bit words of data. ’439 Patent 13:33–39. For example, when the color depth is equal to 10 ($N = 10$), Table 1 indicates that each group includes 4 words packed into 5 fragments, and Table 3 illustrates the order that the fragments are presented. Similarly, when the color depth is equal to 16 ($N = 16$), Table 1 indicates that each group includes 1 word packed into 2 fragments, and Table 5 illustrates the order that the fragments are presented. Accordingly, the Court construes “**each of**

the groups determines a different one of the N-bits words” to mean **“each of the groups determines one or more different ones of the N-bit words.”** This construction does not exclude any of the illustrated embodiments because it states that each group can be one or more of the N-bit words.

III. Remaining Terms

NDT notes in its reply brief that Defendants failed to address certain terms in their responsive brief. Docket No. 135 at 1. NDT requests that the Court adopt its proposed constructions for the term “assert the sequence of encoded fragments to the at least one output” in the ’439 Patent, and the term “characteristic of a transition minimized differential signaling link” in the ’578 Patent. *Id.*

NDT also states in its reply that Defendants represented that several terms were indefinite in the parties’ Joint Claim Construction and Prehearing Statement (Docket No. 106) from the ’498 Patent and the ’328 Patent, but Defendants abandoned their position without comment. *Id.* at 2. Defendants did not file a sur-reply; however, NDT and Dell filed a notice stipulating that the parties resolved all pending claim construction disputes with respect to the ’328 Patent. Docket No. 148 at 1. Lenovo did not join in the notice, nor did it dispute the agreement at the claim construction hearing.

A. The ’498 Patent

In the opening claim construction brief, NDT proposed that the term “the data input of the de-multiplexor” be construed as “the plurality of data inputs of the demultiplexor.” Docket No. 123 at 24. Defendants did not provide a response, and thus, the Court finds that this construction is undisputed. Accordingly, the Court construes **“the data input of the de-multiplexor”** as **“the plurality of data inputs of the de-multiplexor.”**

B. The '328 Patent

In light of the parties' representation that "all pending claim construction disputes with respect to the '328 [P]atent" were resolved, the Court declines to take a position regarding definiteness for the terms in the '328 Patent. *See*, Docket No. 148.

C. The '578 Patent

NDT contends that there is not a true dispute regarding the scope for the term "characteristic of a transition minimized signaling link," and it no longer requires construction. Docket No. 135 at 1. Defendants did not provide a response, and thus, the Court finds that there is no longer a dispute between the parties regarding the scope of this term. Accordingly, the Court will not construe **"characteristic of a transition minimized signaling link."**

D. The '439 Patent

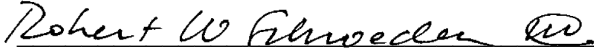
In the opening claim construction brief, NDT proposed that the term "to assert the sequence of encoded fragments to the at least one output" does not require construction. Defendants did not provide a response, and thus, the Court finds that this construction is undisputed. Accordingly, the Court construes **"to assert the sequence of encoded fragments to the at least one output"** to have **its plain and ordinary meaning**.

CONCLUSION

For the foregoing reasons, the Court construes the claim language in this case in the manner set forth above. For ease of reference, the Court's claim constructions are set forth in a table in Appendix A. The parties are ORDERED that they may not refer, directly or indirectly, to each other's claim construction positions in the presence of the jury. Likewise, the parties are ORDERED to refrain from mentioning any portion of this opinion, other than the actual definitions adopted by the Court, in the presence of the jury. Any reference to claim

construction proceedings is limited to informing the jury of the definitions adopted by the Court.

SIGNED this 22nd day of September, 2015.


ROBERT W. SCHROEDER III
UNITED STATES DISTRICT JUDGE

APPENDIX A

United States Patent Number 5,835,498 (the '498 Patent):

| Claim Term | Court's Construction |
|---|--|
| having an inputs | having an input |
| encoder | a device that encodes or translates bits of data into a corresponding encoded data word |
| encoder producing encoded data words | plain and ordinary meaning |
| decoder | a device that decodes or translates an encoded data word into respective bits of data |
| decoder...for decoding data words | plain and ordinary meaning |
| isochronous control codes | control codes that have the highest priority and indicate the transfer of time critical data (such as timing control signals of video or other data), and are capable of maintaining the relative timing between related control codes |
| other control codes identifying streams | control codes that identify and separate multiple data streams and indicate the start or end of a certain type of data transfer |
| the data input of the de-multiplexor | the plurality of data inputs of the de-multiplexor |

United States Patent Number 7,143,328 (the '328 Patent):

| Claim Terms | Court's Construction |
|---|--|
| the auxiliary data [enable] signal is one of the appended to an end of the video data [enable] signal and pre-pended to a beginning of the video data [enable] signal | the auxiliary data [enable] signal is either merged with the trailing edge of the video [data] enable signal at the start of the blanking period or merged with the leading edge of the video [data] enable signal at the end of the blanking period |
| pre-pended to a beginning of the video data [enable] signal | merged with the video data [enable] signal at the leading edge of the video data [enable] signal and at the end of the blanking period |
| appended to an end of the video data [enable] signal | merged with the video data [enable] signal at the trailing edge of the video data [enable] signal and the start of the blanking period |

United States Patent Number 7,295,578 (the '578 Patent):

| Claim Term | Court's Construction |
|--|---|
| at least one audio data stream | at least one stream of audio data |
| clock channel of the link | at least one channel of the link capable of continuously transmitting timing information and other data |
| closely matching the auxiliary data rate | Indefinite |

United States Patent Number 7,599,439 (the '439 Patent):

| Claim Term | Court's Construction |
|--|---|
| P | the rate that the video data is received or generated by the transmitter |
| (N/K)P | the rate of the value of N divided by the value of K multiplied by the value of P, where: P is the rate that the video data is received or generated by the transmitter; N is pixel word size or number of bits in a word of video data; and K is link fragment size or link capacity |
| a second rate that is at least substantially equal to (N/K)P per unit time | a second rate equal to or greater than the value of (N/K)P per unit time |
| each of the groups determines a different one of the N-bit words | each of the groups determines one or more different ones of the N-bit words |
| to assert the sequence of encoded fragments to the at least one output | Plain and ordinary meaning. |